## REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. After amending the claims as set forth above, claims 1, 3-5, 10-18, 20-22, and 24-37 are now pending in this application.

Applicants wish to thank the Examiner for the careful consideration given to the claims.

### Rejection of claims 26 and 32-33 based on 35 U.S.C. 112, first paragraph

Claims 26 and 32-33 are rejected under 35 U.S.C. 112, first paragraph, because it is alleged that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. This rejection is traversed for at least the following reasons.

Claim 26 recites, among other things, that "the smallest radius of curvature $R_{base}$ of the base section and the smallest radius of curvature $r_{transition}$ of the transition region are determined from a side of the membrane which faces the flames." This feature is supported in the specification as originally filed. Fig. 3a and its corresponding written description explains the geometry while Fig. 3b and its corresponding written description explains the physical features. Page 6, lines 32-33 of the specification states that, for the geometry shown in Fig. 3a "[o]nly the outer surface of the surface membrane is depicted in order to bring forward the geometrical elements." (Emphasis added.) Fig. 3a depicts circle 320 with the radius 328 defining the smallest radius of curvature $R_{base}$ and circle 324 with the radius 330 defining the smallest radius of curvature $r_{transition}$. Thus, the features shown in Fig. 3a including the smallest radius of curvature $R_{base}$ of the base section and the smallest radius of curvature $r_{transition}$ are disclosed as being on (or determined from) the outer surface of the membrane (or the side of the membrane which faces the flames). Thus, Fig. 3a and its corresponding written description support the features of claim 26. Thus, claim 26 is supported by the specification as originally filed.

Claim 32 recites, among other things, "wherein a first section of the membrane has a first smallest radius of curvature that results in a first gas speed through the membrane, wherein a second section of the membrane has a second smallest radius of curvature that

results in a second gas speed through the membrane, and wherein the first gas speed is less than the second gas speed." These features are supported in the specification as originally filed. For example, page 3, lines 11-14 of the specification states: "those regions of the burner membrane that have a smaller radius of curvature yield a lower gas speed outside the membrane compared to the regions with a higher radius of curvature." Further, page 2, lines 4-10 describes how the transition region has a smallest radius of curvature that can be smaller than the smallest radius of curvature of the base region. Accordingly, there is support for two regions having different smallest radii of curvature in which the smaller of the smallest radii of curvature can have a lower gas speed than a larger of the smallest radii of curvature. Thus, claim 32 is supported by the specification as originally filed.

Claim 33 recites, among other things, "wherein a distance between the lower flame front and the first section is smaller than a distance between the lower flame front and the second section." These features are supported in the specification as originally filed. For example, page 3, lines 14-18 of the specification states: "A lower gas speed leads to a lower flame front. So the speed of the gas outside the membrane, and subsequently the flame front, can be advantageously modulated over the surface by changing the radius of curvature." When read in conjunction with page 3, lines 11-14 provided above, there is support for two regions having different smallest radii of curvature in which the smaller of the smallest radii of curvature has a lower gas speed than a larger of the smallest radii of curvature, and the different gas speeds result in different distances between the flame front and the respective section (the lower gas speed having the lower flame front). Accordingly, there is support for two regions having different smallest radii of curvature in which the smaller of the smallest radii of curvature has a lower flame front than a larger of the smallest radii of curvature. Thus, claim 33 is supported by the specification as originally filed.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

**Rejection of claim 33 based on 35 U.S.C. 112, second paragraph**

Claim 33 is rejected under 35 U.S.C. 112, second paragraph, because it is alleged that "[t]he distances as claimed in claim 33 are unclear and there is insufficient explanation in the specification to understand what the applicant is attempting to claim." (Pages 2-3 of the

Office Action.) This rejection is traversed at least for the reason that claim 33 is clear and definite.

Fig. 3b of the specification (provided below) shows the lower flame front as being at the point where the gas initially ignites after it has flowed through the knitted metal fibre fabric.

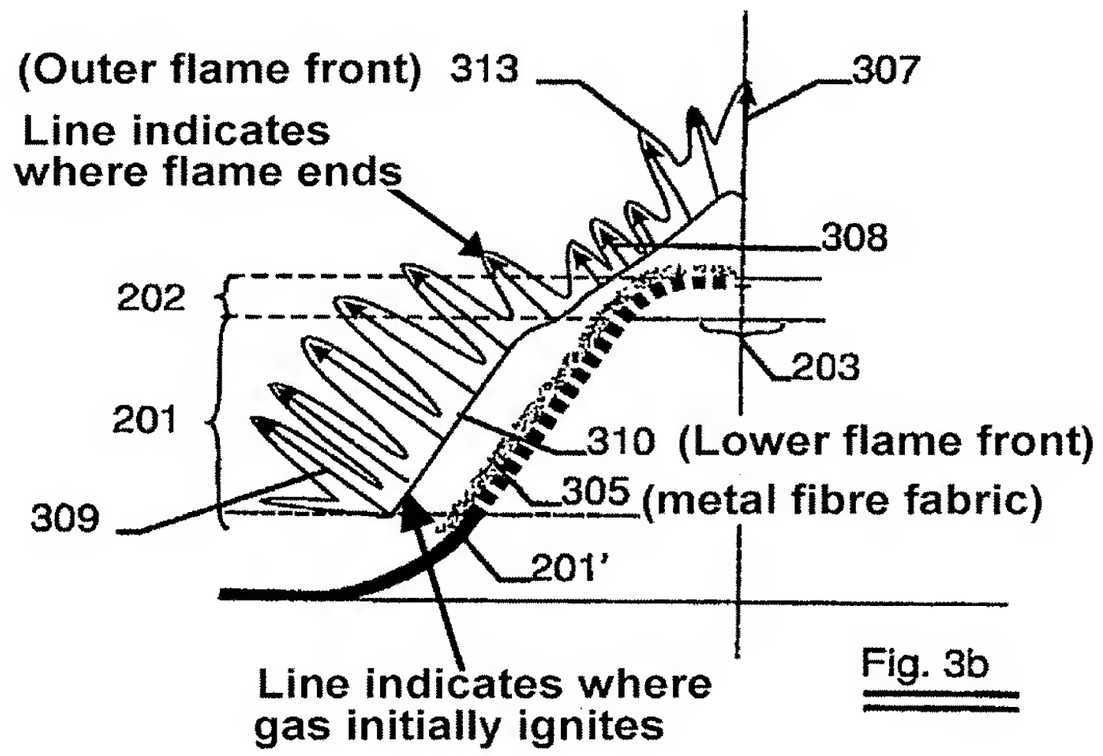


Fig. 3b

Page 8, lines 15-17 of the specification provides: "Also the lower flame front 310 - where the gas ignites - and the outer flame front 313 - where the top of the flame is - is indicated for each of the sections." From these disclosures, one of ordinary skill in the art would understand that the lower flame front is that location in which the gas first ignites and is located at a distance from the metal burner membrane. One of ordinary skill in the art would understand what the lower flame front is and where it is in relation to the other sections of the flame (such as the outer flame front).

Claim 33 recites, among other things, "wherein a distance between the lower flame front and the first section is smaller than a distance between the lower flame front and the second section." These features are supported in the specification as originally filed. For example, page 3, lines 11-14 of the specification states: "those regions of the burner membrane that have a smaller radius of curvature yield a lower gas speed outside the membrane compared to the regions with a higher radius of curvature." Also, page 3, lines 14-18 of the specification states: "A lower gas speed leads to a lower flame front. So the speed of the gas outside the membrane, and subsequently the flame front, can be advantageously modulated over the surface by changing the radius of curvature." From these passages, two

regions may have different smallest radii of curvature in which the smaller of the smallest radii of curvature has a lower gas speed than a larger of the smallest radii of curvature, and the different gas speeds result in different distances between the flame front and the respective section (the lower gas speed having the lower flame front). Accordingly, two regions may have different smallest radii of curvature in which the smaller of the smallest radii of curvature has a lower flame front (the distance between the flame and the section of the respective section of the membrane) than a larger of the smallest radii of curvature. Thus, one of ordinary skill in the art would understand the meaning of the feature "wherein a distance between the lower flame front and the first section is smaller than a distance between the lower flame front and the second section" given the plain and ordinary meaning of the terms and the context provided in the specification.

For at least these reasons, favorable consideration of the rejection is respectfully requested.

**Rejection of claims 29 and 31-33 based on Saponara**

Claims 29 and 32-33 are rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent No. 3,360,028 ("Saponara"). Claim 31 is rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Saponara. For at least the following reasons, these rejections are traversed.

Claim 29 recites, among other things, a method comprising the steps of penetrating gas through a metal burner membrane before igniting the gas, the membrane having a surface that is uninterrupted; igniting the gas such that visible flames having a lower flame front where the gas initially ignites outside the membrane are produced; and modulating gas speed through the membrane over the surface of the membrane by employing a smallest radius of curvature at different sections of the membrane.

Saponara does not teach or suggest the combination of features of claim 29. For example, Saponara do not teach or suggest penetrating gas through a metal burner membrane before igniting the gas and igniting the gas such that visible flames having a lower flame front where the gas initially ignites outside the membrane are produced. Saponara merely discloses a radiant burner. For instance, Saponara discloses that "[o]ur invention relates to a gas fired, infrared ray generator or radiant burner of the general type." (Col. 1, lines 8-10 of Saponara.)

Further, Saponara states that: "by this invention a gas burning infrared generator is produced which requires no venturi and which may be easily and inexpensively fabricated from sheet steel." (Col. 2, lines 60-64 of Saponara.) Furthermore, the independent claims of the patent are drawn to "a gas burning infrared generator." (See independent claims 1 and 4 of Saponara.) Infrared or radiant burners simply do not have gas penetrating through a metal burner membrane before igniting the gas and the gas being ignited such that visible flames having a lower flame front where the gas initially ignites outside the membrane are produced. The PTO asserts "[c]learly, the gas penetrates the metal burner membrane before combustion due to the fact that there is no premixing of fuel and combustion air before the fuel penetrates the membrane." (Page 3 of the Office Action.) Applicants respectfully disagree for at least two reasons.

First, Saponara does not teach or suggest that combustion initially takes place outside the burner. Indeed, because the burner is a radiant burner, one of ordinary skill in the art would understand that combustion is not initiated outside the membrane but is contained within the burner. Saponara is merely clearly disclosing a burner that is infrared-ray based, and not blue-flame based.

Second, on multiple occasions, Saponara discloses the supplying and distribution of a "fuel mixture" for combustion, as such in col. 1, line 51; col. 1, line 52; and col. 2, line 22 of Saponara. One of ordinary skill in the art would understand that the "fuel mixture" is a mixture of fuel and another component, e.g., air. Thus, Saponara merely discloses a premixed gas burner, which would be consistent with Saponara's express statements that their device relates to radiant burners. If the mixture would not have been premixed, this would result in a 'blue flame' mode of gas burner which would be in sheer contradiction with the type of burner that Saponara had in mind, that is a gas burning infrared ray generator for a broiler burner. (Col. 2, lines 31-36 of Saponara.) Using such a burner without premixing in a broiler compartment would lead to immediate extinguishing of the flame due to lack of oxygen in the compartment. Further, using a 'blue flame' mode gas burner for broiling (as suggested by the PTO) may ruin the food. Thus, the PTO's assumptions that there is no air in the burner, that the fuel gas penetrates through a metal burner membrane before igniting the fuel gas, and the gas is ignited such that visible flames having a lower flame front where the

gas initially ignites outside the membrane are produced is simply not supported explicitly or inherently by Saponara. Accordingly, claim 29 is allowable over Saponara.[1]

Also, the PTO makes the statement: "Where the membrane is curved causing denser holes in the mesh there will be a lower flame front due to more restrictive flow of fuel." (Page 3 of the Office Action.) This statement is not supported by Saponara or any documentary evidence. Nowhere in Saponara is such phenomenon described. However, on page 7, lines 31-33 of the present specification, Applicants disclose that "[a]s the hole size is relatively large (1 mm for this embodiment), the change in hole size at the transition region due to the deformation of the plate is not relevant to the flow speed of the gas." Hence, the relevance of the hole size to the gas flow speed as suggested by the PTO was contemplated by Applicants but later refuted because the hole size was too big in order to have a substantial impact on the gas flow. The PTO has not provided any evidence to support a contrary position.

For at least these reasons, claim 29 is allowable over Saponara.

Claim 31 recites, among other things, a base section having a smallest radius of curvature being $R_{base}$, a closing section, and a transition region connecting the base section to the closing section in which the transition region has a smallest radius of curvature $r_{transition}$ being larger than or equal to 0.02 x $R_{base}$ and being smaller than or equal to 0.7 x $R_{base}$. The PTO concedes that Saponara does not teach or suggest the claimed range for $r_{transition}$. On pages 20-21 of the Office Action, the PTO asserts:

[1] It is noted that the present invention can be used whether or not the fuel is premixed.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to optimize the range of the transition radius of curvature of Saponara for the purpose of optimizing the flame shape and heat output range of the burner. It is well known to someone of ordinary skill in the art that a burner membrane with a cross section of a dome or concave shape contour encourages the upward flow of the products of combustion and thus insures continued efficient combustion so that the burner does not extinguish due to oxygen depletion near the burner membrane as evidenced by Saponara. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the dimensions including the range of the R-base and R-transition in order to modify the shape and heat characteristics of the burner. Optimizing the range and curvature of the membrane would be well within the capabilities of someone of ordinary skill in the art and would not have led to undue experimentation at the time of the invention. Furthermore, changing the pattern or shape of the burner membrane would be recognized as a result-effective variable, meaning that the workable range of the dimensions would achieve a recognized result through routine experimentation.

One of ordinary skill in the art would not optimize the membrane of Saponara so as to arrive at the invention of claim 31. In particular, if the membrane of Saponara were to be optimized, one of ordinary skill in the art would optimize the membrane for its operation as a radiant burner. Saponara discloses that one of the goals of the membrane is "to produce a substantially uniform heat output over the entire area of the combustion sustaining surface." (Col. 1, lines 50-54 of Saponara.) In contrast, the invention of claim 31 comprises a metal burner membrane configured such that gas penetrates the membrane before being ignited and visible flames having a lower flame front where the gas initially ignites outside said membrane are produced, which is not a radiant burner. The configuration of claim 31 permits large variations in gas flow rate through the membrane using the same burner because of the different gas speeds though the burner membrane. (Page 3, lines 11-25 of the specification.) Because the radiant burner of Saponara has the goal of achieving a uniform combustion over the entire inner surface of the radiating membrane that is in direct conflict with the burner of claim 31 which has the goal of achieving a large variation in gas flow rate through the membrane, one of ordinary skill in the art would not optimize the geometry of the membrane

of Saponara to arrive at the geometry of the membrane of claim 31. Accordingly, one of ordinary skill in the art would not optimize the geometry of the membrane of Saponara to arrive at the claimed geometrical arrangement of the transition region of claim 31. Thus, claim 31 is allowable over Saponara.

The PTO also asserts that "[t]he applicant has not provided sufficient evidence why the claimed range is non-obvious over the prior art of record." (Page 21 of the Office Action.) However, it is noted that the lack of objective evidence of nonobviousness does not weigh in favor of obviousness. See MPEP § 716.01(a), citing *Miles Labs, Inc. v. Shandon, Inc.*, 997 F.2d 870, 878, 27 USPQ2d 1123, 1129 (Fed. Cir. 1993), *cert. denied*, 127 L. Ed. 232 (1994). In other words, simply because Applicants did not provide unexpected results or other evidence of nonobviousness does not provide a proper basis for obviousness. It is the PTO who carries the initial burden of factually supporting a *prima facie* case of obviousness. See MPEP § 2142. If an Examiner does not produce a *prima facie* case, an applicant is under no obligation to submit evidence of nonobviousness. See MPEP § 2142. The PTO merely argues that one of ordinary skill in the art would optimize the membrane of Saponara so as to arrive at the invention of claim 31. The PTO provides no evidence or technical reasoning to support this statement or otherwise show why one of ordinary skill in the art would have had such an understanding. Indeed, as Applicants have pointed out, the radiant burner of Saponara is a very different type of burner from the burner of claim 31 so one of ordinary skill in the art would not optimize the radiant burner of Saponara to arrive at the invention of claim 31. Accordingly, claim 31 is allowable over Saponara.

The PTO also states that "while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function." (Page 21 of the Office Action.) This position is irrelevant to claim 31 and claim 29 from which claim 31 depends because claims 29 and 31 are method claims. As a result, the function of the individual components should be considered when comparing claims 29 and 31 to the prior art. Because the PTO has not properly considered claim 31 to be a method claim, the rejection based on claim 31 is improper and should be withdrawn.

Further, on page 21 of the Office Action, the PTO states:

> Clearly, the apparatus of Saponara contains all the claimed features of the applicant's invention. The only discernable distinction between the prior art and this instant application is the specific range of the dimensions and the material choice for the membrane. It is the examiner's opinion that merely changing the dimensions of the prior art and selecting a material choice for the membrane is not grounds for allowance.

However, Applicants respectfully submit that the difference between claim 31 and Saponara is not merely "changing the dimensions of the prior art and selecting a material choice for the membrane." The modifications to Saponara require a totally different approach of design because the shape of the burner membrane is described in relative measures (R-base and r-transition being the main parameters therein), which Saponara does not directly address, and involve changing the radiant burner of Saponara to a metal burner membrane configured such that gas penetrates the membrane before being ignited and visible flames having a lower flame front where the gas initially ignites outside the membrane are produced (a totally different principle of operation). Because the burner of Saponara has to be interpreted as carrying out a totally different principle of operation for the rejection to have any merit, the rejection based on such an interpretation is improper. (See MPEP 2143.01.[2]) Accordingly, claim 31 is allowable over Saponara.

Further, claims 31-33 depend from and contain all the features of claim 29, and are allowable for the same reasons as claim 29, without regard to the further patentable features contained therein.

For at least these reasons, favorable reconsideration of the rejections is respectfully requested.

**Rejection of claims 1, 5, 10-18, 22, 24-28, and 30 based on Saponara and Marrecau**

Claims 1, 5, 10-18, 22, 24-28, and 30 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Saponara and U.S. Patent No. 6,149,424 ("Marrecau"). For at least the following reasons, this rejection is traversed.

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[2] "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)."

Claim 1 recites, among other things, a metal burner membrane configured such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane. The membrane comprises a base section having a smallest radius of curvature being $R_{base}$, a closing section, and a transition region connecting the base section to the closing section. The membrane is uninterrupted. The transition region has a smallest radius of curvature $r_{transition}$ being larger than or equal to 0.02 x $R_{base}$ and being smaller than or equal to 0.7 x $R_{base}$. Saponara and Marrecau do not teach or suggest this combination of features.

For example, Saponara and Marrecau do not teach or suggest a metal burner membrane configured such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane. As outlined above, Saponara merely discloses a radiant burner, which does not have a configuration such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane. Further, Saponara does not teach or suggest that combustion takes place outside the burner.

Marrecau does not cure the deficiencies of Saponara because Marrecau does not teach or suggest a metal burner membrane configured such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane. Marrecau discloses a burner operating in a radiant mode. (See paragraphs 7 and 10 of the Folkers Declaration filed on July 16, 2010.) A radiant burner like that disclosed in Marrecau is designed to have combustion <u>inside</u> the membrane with substantially no external flame to make the membrane incandescent. (See paragraphs 7, 10 and 12 of the Folkers Declaration.) The purpose of a burner working in a radiant mode is to generate infrared radiation. (See paragraph 7 of the Folkers Declaration.) This is achieved by having the combustion of the gas inside the membrane, whereby the generated heat immediately heats up the stainless steel which starts to emit radiation. The Stephan-Boltzmann law for black body radiation describes the emission of radiation to be proportional to the fourth power of the absolute temperature of the body. (See paragraph 7 of the Folkers Declaration.) It is respectfully submitted that the gas burner of claim 1 and the radiant burner of Marrecau are two different types of burners in which the physics governing both types of

burners are totally different. (See paragraphs 7-8 of the Folkers Declaration.) Hence, the gas burner of claim 1 in which the flame is initially ignited outside of the membrane and exists outside of the burner is simply not the same as the radiant burner of Marrecau (or Saponara) in which the flame remains within the burner and is not initially ignited outside the membrane.

The declaration of Geert Folkers sets forth the comparison between radiant burners versus non-radiant burners. Saponara and Marrecau each discloses a radiant burner. A burner operating in a radiant mode is designed to have combustion inside the burner with substantially no external flame to make the membrane incandescent. (See paragraph 7 of the Folkers Declaration.) The purpose of a burner working in radiant mode is to generate infrared radiation. *Id.* In contrast, the invention of claim 1 is not a radiant burner but relies upon a flame being present outside of the membrane. (See paragraph 8 of the Folkers Declaration.) Such a gas burner operates in the "blue flame mode." *Id.* In a gas burner operating in a "blue flame mode," the intention is to control the gas flow pattern as the gas is first ejected out of the burner and then the gas is ignited. The membrane itself serves to distribute the gas but the purpose of a gas burner is to generate heat, and not to increase the temperature of the membrane *per se*. *Id.*

The difference between the gas burner of claim 1 working in a blue flame mode and the radiant burner of Saponara and/or Marrecau working in a "radiant mode" is that, in the former, the gas penetrates the membrane before being ignited. In other words, the membrane of claim 1 does not necessarily heat up appreciably to emit a red glow but relies upon the flame outside the membrane for heating. (See paragraph 10 of the Folkers Declaration.) Indeed, as explained in paragraphs 8-9 of the Folkers Declaration and accompanying exhibits, there is no more radiant output at 1 $MW/m^2$ as the membrane does not heat up anymore. (See Fig. 3.3 of Exhibit 1 of the Folkers Declaration.) The burner of claim 1 is operating above this region of output (that is, the burner of claim 1 operates in the region where the gas penetrates the metal burner membrane before being ignited outside the membrane). One of ordinary skill in the art would not operate the radiant burners of Saponara and/or Marrecau so as to have gas penetrate the membrane before being initially ignited because the uncombusted gas would lower the temperature of the membrane, which would run contrary to operating the membrane to reach its optimum temperature for radiant mode operation. Accordingly, one of

ordinary skill in the art would not operate a radiant burner such that gas penetrates the membrane before igniting.

Because Saponara and Marrecau do not teach or suggest a metal burner membrane configured such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane, claim 1 is allowable over Saponara and Marrecau.

Furthermore, Saponara and Marrecau do not teach or suggest that the transition region has a smallest radius of curvature $r_{transition}$ being larger than or equal to 0.02 x $R_{base}$ and being smaller than or equal to 0.7 x $R_{base}$. The PTO seems to concede this point but then asserts that it is merely a matter of optimizing the range of the transition radius of curvature of Saponara (for the reasons similar to those provided for claim 31 above.)

It is respectfully submitted that this analysis is incorrect. If the membrane of the resulting combination of Saponara and Marrecau were to be optimized, one of ordinary skill in the art would optimize the resulting combination for its operation as a radiant burner. As previously mentioned, Saponara discloses that one of the goals of the membrane is "to produce a substantially uniform heat output over the entire area of the combustion sustaining surface." (Col. 1, lines 50-54 of Saponara.) In contrast, the invention of claim 1 relates to a metal burner membrane configured such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane, which is not a radiant burner. The configuration of claim 1 permits large variations in gas flow rate through the membrane using the same burner because of the different gas speeds though the burner membrane. (Page 3, lines 11-25 of the specification.) Because the radiant burner of the combination of Saponara and Marrecau has the goal of achieving a uniform combustion over the entire inner surface of the radiating membrane that is in direct conflict with the burner of c which has the goal of achieving large variation in gas flow rate through the membrane, one of ordinary skill in the art would not optimize the geometry of the membrane of the combination of Saponara and Marrecau to arrive at the geometry of the membrane of claim 1. Accordingly, one of ordinary skill in the art would not optimize the geometry of the membrane of the combination of Saponara and Marrecau to arrive at the claimed geometrical arrangement of the transition region of claim 1. Thus, claim 1 is allowable over Saponara and Marrecau.

Also, the PTO asserts that "[t]he applicant has not provided sufficient evidence why the claimed range is non-obvious over the prior art of record." (Page 8 of the Office Action.) As previously mentioned, the lack of objective evidence of nonobviousness does not weigh in favor of obviousness. The PTO merely argues that one of ordinary skill in the art would optimize the membrane of the Saponara-Marrecau combination so as to arrive at the invention of claim 1. The PTO provides no evidence or technical reasoning to support this statement or otherwise show why one of ordinary skill in the art would have had such an understanding. Indeed, as Applicants have pointed out, the radiant burner of the Saponara-Marrecau combination is very different from the burner of claim 1 so one of ordinary skill in the art would not optimize the radiant burner of the Saponara-Marrecau combination to arrive at the invention of claim 1. Accordingly, claim 1 is allowable over Saponara.

Further, on page 9 of the Office Action, the PTO states that the "only discernable distinction between the prior art and this instant application is the specific range of the dimensions and the material choice for the membrane." As previously mentioned, the difference between claim 1 and the Saponara-Marrecau combination is not merely "changing the dimensions of the prior art and selecting a material choice for the membrane." The modifications to Saponara and Marrecau require a totally different approach of design because the shape of the burner membrane is described in relative measures (R-base and r-transition being the main parameters therein), which Saponara and Marrecau do not directly address, and involve changing the radiant burner of the Saponara-Marrecau combination to a metal burner membrane configured such that, during use, gas penetrates before being ignited and resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane (a totally different principle of operation), which makes the proposed modification nonobvious. (See MPEP 2143.01 above.) Accordingly, claim 1 is allowable over Saponara and Marrecau.

Claims 10 and 12-18 are allowable over Saponara and Marrecau. The PTO merely asserts that the structural differences recites in these claims are obvious, with no supporting evidence or documentation. A rejection based on these grounds is clearly improper. The Supreme Court in *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727 (2007) has not removed the requirement that the prior art reference (or references when combined) must teach or suggest all the claim limitations. Indeed, *KSR* emphasized cases where all features are known.

Furthermore, the exemplary rationales listed in MPEP 2143 suggests that all elements (when the references are combined) need to be known in the art to support a conclusion of obviousness. Thus, the PTO is not relieved of its responsibility of finding prior art teaching or suggesting all the features of the claimed invention to establish a *prima facie* case of obviousness. The assertion that the claimed structural differences are obvious is no substitute for finding prior art for establishing the claimed structural differences. Accordingly, claim 10 and 12-18 are allowable over Saponara and Marrecau.

Further, claims 5, 10, 10-18, 22, and 24-28 depend from and contain all the features of claim 1, and are allowable for the same reasons as claim 1, without regard to the further patentable features contained therein.

Claim 30 depends from claim 29. As previously mentioned, Saponara does not teach or suggest all the features of claim 29. Marrecau does not cure the deficiencies of Saponara because Marrecau does not teach or suggest that gas penetrates through the membrane before being ignited and igniting the gas such that visible flames having a lower flame front where the gas initially ignites outside the membrane are produced. Marrecau discloses a burner operating in a radiant mode. The method of claim 29 and the operation of the radiant burner of Marrecau are two different modes of operation in which the physics governing both types of burners are totally different. Because neither Saponara nor Marrecau teaches or suggests that gas penetrates through the membrane before being ignited and igniting the gas such that visible flames having a lower flame front where the gas initially ignites outside the membrane are produced, claim 29 and its dependent claim 30 are allowable over Saponara and Marrecau.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

**Rejection of claims 3-4 and 20-21 based on Saponara, Marrecau and Dewaegheneire**

Claims 3-4 and 20-21 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Saponara, Marrecau and U.S. Patent No. 6,065,963 ("Dewaegheneire"). Claims 3-4 and 20-21 depend from and contain all the features of claim 1. As previously mentioned, Saponara and Marrecau disclose a radiant burner, and they fail to disclose a metal burner membrane configured such that, during use, gas penetrates before being ignited and

resulting in visible flames having a lower flame front where the gas initially ignites outside said membrane and that the smallest radius of curvature of the transition region $r_{transition}$ is in the range of $0.02 \times R_{base}$ to $0.7 \times R_{base}$. Dewaegheneire does not cure these deficiencies. Thus, claim 1 and its dependent claims 3-4 and 20-21 are allowable over Saponara, Marrecau and Dewaegheneire.

Also, none of Saponara, Marrecau, and Dewaegheneire is concerned with increasing the dynamic range of the gas burner membrane which is the prime concern of the invention of claim 1. (See page 3, lines 11-27; and page 8, lines 19-22 of the specification.) None of Saponara, Marrecau, and Dewaegheneire discuss the impact the radii of curvature has on the flame front. (Fig. 3b and page 8, lines 11-17 of the specification.) Thus, one of ordinary skill in the art would not be able to combine Saponara, Marrecau and Dewaegheneire to arrive at the invention of claim 1. Thus, claim 1 and its dependent claims 3-4 and 20-21 are allowable over Saponara, Marrecau and Dewaegheneire.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

**Allowability of claim 34-37**

Claim 34-37 have been added. Support for claim 34 can be found, for example, on page 3, lines 11-18 of the specification. Claim 34 recites, among other things, a method for modulating the gas speed of a gas over a surface of a gas burner, said gas burner comprising an uninterrupted metal burner membrane, comprising: modulating the gas speed through the membrane over a surface of the membrane by employing a different smallest radius of curvature at different sections of said membrane. None of Saponara, Marrecau, and Dewaegheneire teach or suggest this combination of features. Claims 35-37 are allowable by virtue of their dependency from claim 34, without regard to the further patentable features contained therein. For at least these reasons, allowance of claims 34-37 is respectfully requested.

**Conclusion**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date 4/4/2011

By Matthew J. Kremer

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